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Success factors when implementing AI-powered marketing solutions

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Abstract

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Artificial intelligence (AI) has been proven to boost marketing performance in various use cases. However, many decision-makers in organizations lack the understanding of how to successfully implement it. This research aims to discover and analyze the factors that made two implementation projects of AI-powered marketing solutions successful.

The topic was researched by creating two case studies of successful implementation projects of AI-powered marketing solutions and analyzing the factors that made them successful. The case studies were crafted using interviews with expert informants as the primary source of data. The case study narratives were supported by secondary data such as literature on the topic.

What is concluded from the research is that factors such as agile development practices, supportive company culture, multidisciplinary development team and close customer/end-user involvement were factors in the success of both implementation projects.

This paper is divided to 7 parts: introduction, theoretical framework, research methodology, case study 1, case study 2, results and discussion.

Keywords

Artificial Intelligence, Marketing, Machine Learning, Success Factors, Implementation

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1 Introduction

Artificial intelligence has been proven to boost marketing performance in various use cases. In order for organizations to utilize AI to the fullest extent, there needs to be an understanding of how to successfully implement it. This research aims to provide relevant insight for companies and individuals who are interested in succeeding in such projects.

The main objective of the research is to demonstrate how to successfully implement artificial intelligence into marketing activities. The subject matter was researched by creating two case studies of successful implementation projects of AI-powered marketing solutions and analyzing the factors that contributed to their success.

The primary research question of the study is: what are the success factors when implementing AI-powered marketing solutions? This question was researched by collecting primary data by interviewing two informants, who were in leading roles in implementation projects of AI-powered marketing solutions. From the interviews, two case studies were crafted with the support of secondary data such as blog posts, articles and other literature.

What is concluded from the research is of most significance to organizations who are interested in implementing similar projects in the future. The research also aims to demystify artificial intelligence as a buzz word, showing real-life examples of its practical applications in marketing.

This research is divided into 6 parts: theoretical framework, research methodology, case study 1, case study 2, results and discussion. The theoretical framework presents the theory behind the concepts discussed in the paper. Research methodology demonstrates how the research was designed and conducted. Case studies 1 and 2 lay out the two implementation projects of AI-powered marketing solutions. Results reveal the analyzed success factors. Discussion chapter further discusses the research and its results from a broader standpoint.

2 Theoretical framework

2.1 Artificial Intelligence

Artificial Intelligence (AI) is the science and engineering discipline of creating intelligent machines, especially intelligent computer systems (McCarthy 2007). It was established as a subfield of Computer Science in 1956 at Dartmouth College. (Russell & Norvig 2010, 17.)

Since its inception as a field of study in 1956, AI has gone through various hype cycles, which were followed by periods of reduced funding and interest in the field, commonly called the *AI winters*. During the AI winters, the financial investment towards AI significantly dropped, as companies and academia failed to deliver on their extravagant promises. (Russell & Norvig 2010, 17-28.)

After 2001, very large data sets were available on the web, such as English words and images, that could be used to train AI systems. Contemporary work in AI suggests that data is a more integral part than algorithms for solving many problems, and even mediocre algorithms can produce great results when given enough data. Since then, practical applications of AI have become more common and they are embedded in many industries. (Russell & Norvig 2010, 27-28.)

In recent times AI has gained significant media attention and its practical applications have increased in business and personal use. According to a leading researcher in the field, Andrew Ng, AI has been recently taking off primarily because of factors such as advanced algorithms (like deep neural networks), increased computational power and large sets of data. Ng also calls AI the new electricity and states that AI has reached an eternal spring. (Ng 25 January 2017.)

The problem with defining AI is the lack of a universally accepted definition of intelligence when it comes to machines and computer systems (McCarthy 2007). Tesler's theorem (ca 1970), credited to computer scientist Larry Tesler states: "Intelligence is whatever machines haven't done yet". *AI Effect* is the phenomena of when a machine performs intelligent behavior, it is later reduced to normal computation. In fact, many classical AI problems are now solved and are part of our everyday lives like optical character recognition (Müller 2016, 3).

Artificial General Intelligence (AGI) and human-level AI (HLAI) are efforts to create machines that can perform multiple intellectual tasks like humans (Russell & Norvig 2010, 27). Artificial Narrow Intelligence – also called weak or narrow AI - is non-sentient artificial intelligence that is used to perform a one specific task such as recognizing speech or winning a game of chess (Rouse, M & Laskowski, N December 2016). The vast majority of practical applications of AI today are considered as narrow or weak AI.

Practical applications of AI in business include Robotic Process Automation (RPA), Natural Language Processing (NLP), Natural Language Generation (NLG), Image Recognition, Computer Vision among others. (Rouse, M & Laskowski, N December 2016.)

2.2 Machine learning & deep learning

As with AI - even among Machine Learning practitioners - there isn't a universally accepted definition of Machine Learning (Ng 2017). Early AI researcher Arthur Samuel, who coined the term Machine Learning in 1959, defined it as:

> Field of study that gives computers the ability to learn without being explicitly programmed.

A more modern and operational definition of Machine Learning is from the computer scientist Tom Mitchell (1998):

> A computer program is said to learn from experience *E* with respect to some class of tasks *T* and performance measure *P* if its performance at tasks in *T*, as measured by *P*, improves with experience *E*.

Machine learning as a field explores the study and construction of algorithms that can learn from and predict from data (Kohavi & Provost 1998). Machine learning is closely related to and sometimes overlaps with computational statistics, which is also a study concerned with learning and predicting from data (Mannila 1996, 2). Machine learning is also a common technique in predictive analytics – which is a broad term for techniques that develop models which predict future events or behaviors (Nyce 2007, 1).

Deep Learning is a subfield of machine learning. It differentiates from standard machine learning as it consists of multiple hidden layers of artificial neural networks. Artificial neural networks are learning algorithms inspired by biological neural networks, like the ones in a

human brain. Increased computational power and large datasets of recent years have unleashed the untapped capabilities of deep learning algorithms. (Brownlee 16 August 2016.)

Machine learning and deep learning algorithms are deployed in various applications today such as text and document classification (e.g., spam detection in email), natural language processing, speech recognition, optical character recognition, computer vision, fraud detection, games, recommendation systems and search engines. (Mohri, M; Rostamizadeh, A; Talwalkar, A 2012, 1-2)

2.3 Marketing

American Marketing Association defines marketing as:

> Marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large. (Approved July 2013)
> (American Marketing Association 2017.)

Marketing management is the discipline of managing marketing activities in an organization (Kotler & Keller 2012, 5). Top marketing academics Philip Kotler and Kevin Lane Keller define marketing management as:

> The art and science of choosing target markets and getting, keeping, and growing customers through creating, delivering, and communicating superior customer value. (Kotler & Keller 2012, 5.)

The 10 main entities that are being marketed are goods, services, events, experiences, persons, places, properties, organizations, information and ideas. The key customer markets to consider are consumer, business, global and non-profit. (Kotler & Keller 2012, 5-9.)

The 4P's of marketing is a foundational marketing model created by E. Jerome McCarthy, published in 1960 to demonstrate the key aspects to consider in marketing. The 4P's are: product, price, promotion and place. However, as marketing has changed since then, the 4Ps have been updated by many practitioners to newer models. (Kotler & Keller 2012, 25.)

Figure 1. 4P's Marketing Mix. (Kotler & Keller 2012, 25.)

Marketing as a field is immensely different from what it was just ten years ago, due to global megatrends such as digitization and globalization. Consumer buying power has significantly increased as consumers can research information about companies and offerings on the internet as well as purchase through ecommerce rather than from physical stores. (Kotler & Keller 2012, 14)

Consumers' power of influence has also increased as digital platforms such as social media allow consumers to express their opinions and leave reviews publically about a company, person or offering (Deloitte 2014, 2). This – among other factors - has led into the rise of social media marketing. Social media marketing is a term for enhancing a brand image through social media (Kotler & Keller 2012, 14).

The internet has proven to be a powerful information and sales channel that enables informing and promoting at scale (Kotler & Keller 2012, 14). Consumer attention is also shifting from traditional channels such as television, newspapers and radio, into digital channels (Duncan, Hazan & Roche 2013, 3). This has led into new digital marketing strategies such as content marketing, search engine marketing (SEM) and search engine optimization (SEO). The rise of digital marketing has also presented many challenges in marketing, such as increased complexity, understanding the customer journey and lack of capability in areas such as data and customer experience (Econsultancy 2017).

The many digital platforms in use today enable collecting customer behavior data from multiple sources such as web cookies, mobile applications, social media channels and email open-rates. The collected data can be used to help with business decisions via market segmentation and predictive analytics. Management consulting firm McKinsey's analysis shows that using data to make better marketing decisions can increase productivity by between 15 and 20 percent (van Bommel, Edelman & Underman 2014).

2.4 Artificial intelligence in marketing

Advancements in AI and its practical applications in other fields, have led into the development of AI systems that have proved to be useful for marketers. As contemporary marketing is increasingly digital, more data is available for the use of AI systems. AI systems can assist marketers in tasks such as market research, churn analysis, social media monitoring and personalization of customer experience (Sterne, J 2017, 145-217).

AI systems for marketing can be roughly categorized to tailored AI systems for individual use cases and to vendor-provided software and software-as-a-service (SaaS) solutions which incorporate AI features. Tailored and original AI systems can be either developed by organizations' internal AI team, external service providers or a mixture of both. Many vendor-provided marketing AI platforms also require tailoring for individual use cases. (Sterne, J 2017, 218-231.)

Many marketing software and software-as-a-service providers have invested in AI and technology company IBM is providing their own marketing automation platform with IBM Watson Campaign Automation that has built-in AI. The world's leading Customer Relationship Management (CRM) software provider Salesforce is also stepping into the AI realm with their AI solution Salesforce Einstein, which is integrated into their platform. (Sterne, J 2017, 218-231.)

The founder of Marketing Artificial Intelligence Institute, Paul Roetzer has developed a framework for artificial intelligence in marketing called the 5Ps of Marketing Artificial Intelligence. The framework was created to simplify and visualize the field and it is based on his research conducted with various AI providers and engineers on how AI can assist in marketing. (Roetzer 20 September 2017.)

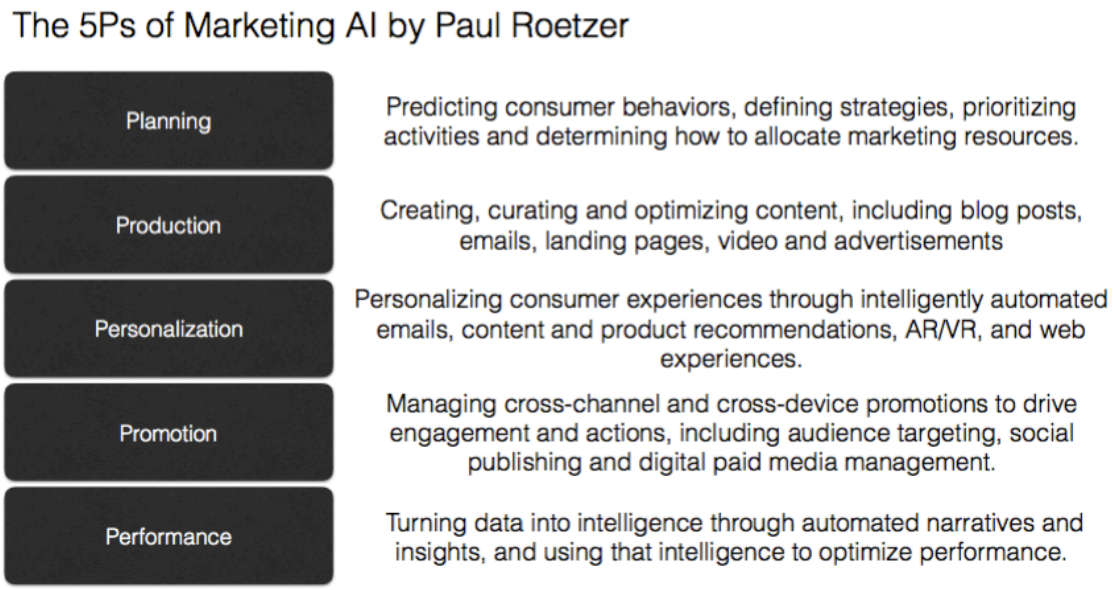

Figure 2. 5P's of Marketing AI by Paul Roetzer (20 September 2017), illustration recreated by Mikael Mölsä.

Artificial intelligence is today used to assist marketers in tasks such as: digital advertising buying (programmatic buying), website operation and optimization, search engine optimization, A/B testing, outbound email marketing and lead filtering and scoring. (Davenport, T.H. 2017.)

2.5 Success factors when implementing AI in business

McKinsey Global Institute's 2016 discussion paper *Artificial Intelligence: The Next Digital Frontier*, states that "Successful AI transformations require elements similar to those found in successful digital and analytics transformations". The elements are: use cases/sources of value, data ecosystems, techniques & tools, workflow integration and open culture & organization. (Bughin, J & al. 2016, 32.)

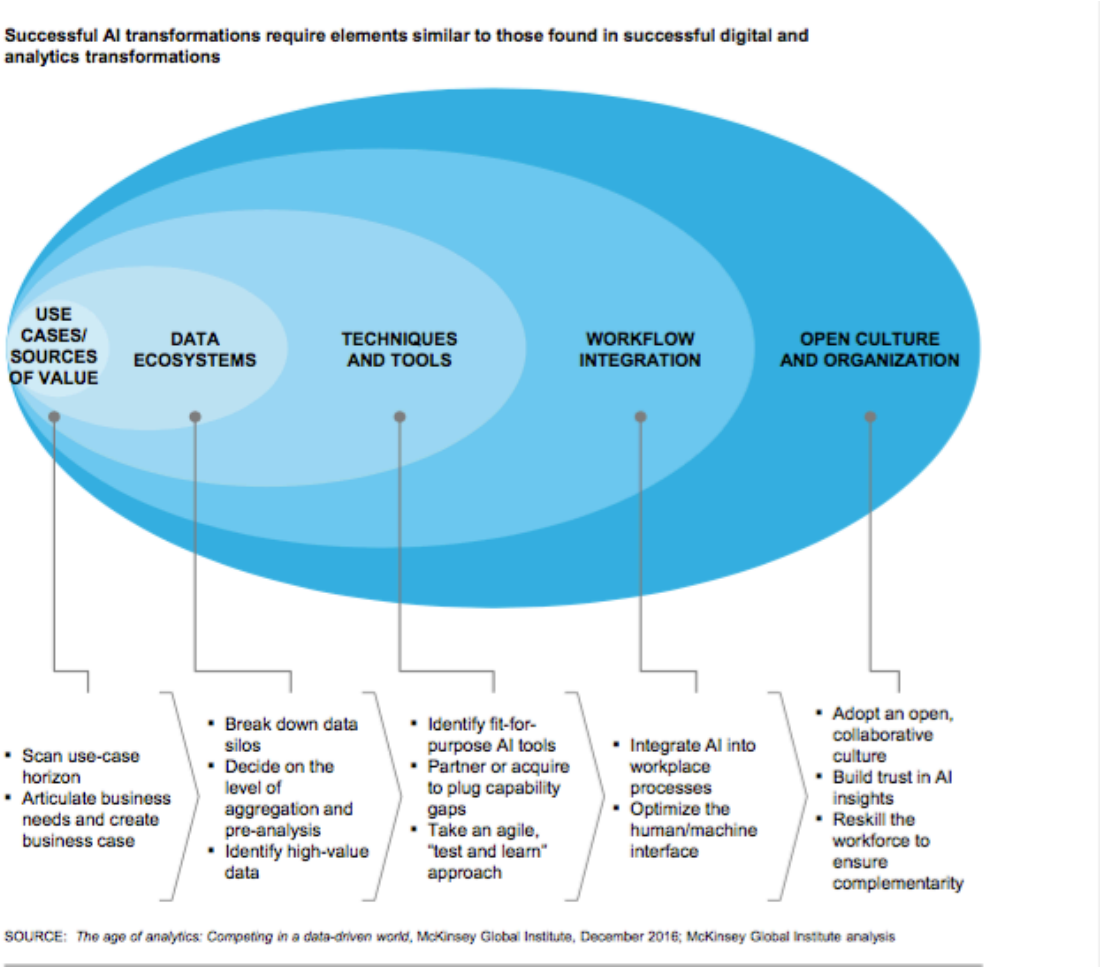

Figure 3: Elements of successful AI transformations. (Bughin, J & al. 2016, 32.)

When building a business case for AI, it is important to understand its capabilities and aim to find a use case of true value for it that is aligned with the organizations strategy. Incorporating AI might lead into designing new business processes, which should also be taken into consideration. For immediate future, organizations should focus on already proven technology solutions, whilst further along identify opportunities that haven't been proven yet at scale. (Bughin, J & al. 2016, 32-33.)

Similar to other digital technologies, an agile "test and learn" approach is vital when implementing AI. Companies can set up cross-functional AI teams, prototype a solution within weeks, test it with business units and then decide how to advance in the project. (Bughin, J & al. 2016, 34.)

Building a data ecosystem is essential, since data is the oil that keeps the AI engine running. Organizations should evaluate which data could bring true value and a competitive advantage to their operations. It is also beneficial to make non-relational data – also

known as *flat data* - usable with technologies such as NoSQL or Hadoop. (Bughin, J & al. 2016, 33.)

In order to capture all the benefits of AI, organizations can partner with AI start-ups or leading AI companies. However, it is also essential to build organizations' internal AI capabilities. The internal roles to fill are "translators" whose role is to bridge the gap between data science and business processes and data scientists, who design, develop, deploy and train AI technologies. (Bughin, J & al. 2016, 33-34.)

When processes are redesigned, change management of altering human work tasks can be even more demanding than the technical challenges. Therefore, optimizing the human-machine interface and building trust to AI-powered insights in the organization is important. In the long run, an AI transformation also requires changes in the employees' skills, mindsets and culture. Leadership is also important, as strong AI-adoption correlates with strong leadership support. (Bughin, J & al. 2016, 33-34.)

3 Research methodology

3.1 The case study research strategy

Case study is a widely accepted research strategy in the field of business administration, social sciences, political research among many others. The case study method enables a holistic description of real-life events such as organizational processes and projects. (Yin, R, K 1984, 1-2.)

The case study research has been criticized for its lack of rigor as some case study investigators have let equivocal evidence or biased views affect their research. However, case study research should be conducted unbiasedly and it is not the only form of research that biased views have affected negatively. (Yin, R, K 1984, 1-2.)

Another common criticism of case study research is that it can't be generalized into scientific facts as it only focuses on a single case – or in two cases like in this research. However, similar to experimental research, case studies can be generalized into theoretical propositions which can also prove to be useful. (Yin, R, K 1984, 9-10.)

The case study strategy was chosen for this research in order to provide a comprehensive description of two implementation projects of AI-powered marketing solutions. The aim of

the research is not to provide scientifically factual results but rather provide valuable theoretical insight that can possibly assist other organizations in similar projects.

3.2 Research design

3.2.1 Selection of the case study projects

The projects chosen to be represented in the case studies are from companies Smartly.io and Dagmar. The two cases are similar in many ways as depicted in the results section of the research. However, the organizations are vastly different as Smartly.io is a marketing software-as-a-service company, whereas Dagmar is a marketing agency.

The cases were chosen to demonstrate two slightly similar implementation projects of AI-powered marketing solutions, in two vastly different organizations. This allows the comparison of the two cases and the exploration of the wider organizational aspects relating to the projects.

3.2.2 Data sources

Data collection was conducted with both primary and secondary sources of data. The primary sources of data were interviews conducted with people in leading roles in the implementation projects. One interview was conducted per case study. Secondary sources of data were company web sites, blog posts and other relevant sources referenced throughout the text.

3.2.3 Data collection

The techniques for data collection were semi-structured interviews and secondary source analysis. The most valuable data was collected from face-to-face interviews conducted with the key informants of both case studies.

The interview of the first case study was conducted in English, in a restaurant, located in Helsinki. The length of the interview was 42 minutes. The interview for the second case study was conducted in Finnish, in Dagmar's company premises, located in Helsinki. The length of the interview was 55 minutes. Both of the interviews were recorded with a Zoom H2N Handy recorder and later transcribed. Written transcriptions of both interviews were sent to the informants for reviewing.

3.2.4 Interview questions

Because the interviews were semi-structured, the questions in each interview varied, however, the questions that were prepared for both of the interviews were:

- Introduce yourself and your role in the company.
- Give a brief overview of the company and its history.
- How would you describe the organizational culture and values at the company?
- How would you describe the organizational structure at the company?
- Describe briefly the timeline and steps to AI adoption at your company.
- Can you give me a general overview of use cases of AI at your company?
- Describe the background that led into the implementation project of the AI-powered marketing solution [that the case study is about]?
- Were there any alternative solutions than implementing AI?
- What were the risks and expected benefits when going into the project?
- Can you walk me through the different phases of the project?
- What kind of challenges you faced during the project?
- Which KPIs and goals you had for the project and how were they measured?
- Which tools and techniques you used in the project?
- What did you learn from the project?
- In retrospect: what went well and what could've been done better?
- How are you maintaining the solution?
- Is there any advice you would give to companies interested in implementing similar solutions?

3.3 Research methods

The research method of the study is the qualitative conduction of two explanatory case studies of successful implementation projects of AI-powered marketing solutions. The case studies were planned and designed to provide interesting narratives and demonstrate the different phases, challenges and success factors of the projects.

The case study method was chosen to facilitate an understanding of the complexity and contextual conditions of the projects and also provide a compelling narrative for the readers of the research. The results of the study were analyzed by comparing the case study narratives to existing theory on the subject, mainly to McKinsey Global Institute's 2016 discussion paper *Artificial Intelligence: The Next Digital Frontier*.

4 Case Study 1: How Smartly.io implemented Predictive Budget Allocation feature to their platform

4.1 Introduction to Smartly.io

Smartly.io is a Finnish software-as-a-service company that automates Facebook and Instagram advertising for large companies internationally. The company provides a tool – also called The Smartly platform – which enables companies to create, manage, launch and optimize their Facebook & Instagram advertising campaigns. (Smartly.io 2017)

Smartly.io is an official Facebook Marketing Partner and the Smartly platform is integrated with Facebook's APIs and ecosystem. The Smartly platform works as a tool that builds on top of Facebook's own solutions for advertising. (Ojala 10 October 2017.)

Figure 4. Smartly.io's logo. (Smartly.io 2017.)

4.2 Organizational structure

The company comprises of two main departments: one for software development and one for account management/sales. In addition to the main departments, Smartly.io also has smaller departments/teams for service operations, marketing and legal. (Ojala 10 October 2017.)

The development department has about 60 people in total, divided to 6 different teams with distinct focus areas. One of the teams is the optimization team, that is in charge of their Predictive Budget Allocation -feature. The development department is located in Helsinki, Finland. (Ojala 10 October 2017.)

The department for Account Management spreads internationally to locations such as San Francisco, New York, Buenos Aires, Helsinki, Berlin, Singapore, Dubai and Australia. Its main task is to acquire new customers as well as manage relationships with the existing ones. (Ojala 10 October 2017.)

The service operations team – which resides in Helsinki - answers customer questions through an online support system. Interestingly, the team doesn't comprise of a specific group of people as everybody in the company – including the CEO – perform customer support in a rotation. (Ojala 10 October 2017.)

4.3 Organizational culture

Culture is of the utmost importance at Smartly.io as the company has even released their own *Culture Playbook (2017)* which states:

> Culture is the bedrock we've built Smartly.io on—it defines us as a company. We believe that our culture, with product development speed at its core, leads to long-term growth and success.
> (Smartly.io 2017.)

In the *Culture Handbook*, the company describes itself as a "flat organization with transparency", meaning that it has autonomous, self-organizing teams with freedom and responsibility to make their own decisions. (Smartly.io 2017.)

The employees of the company are described to be full-stack, meaning they have core skills in one area but are also able to work in different disciplines. For instance, many of their account managers code and do technical support, whereas their software developers are familiar with their customers' business needs and problems. (Smartly.io 2017.)

Another distinctive feature about Smartly.io is the close collaboration with their customers in terms of developing their tool and working closely with them. They even fly some of their most advanced customers to Helsinki to work with their developers. The company also provides technical customer support around the clock every week day. (Smartly.io 2017.)

4.4 Introduction to the feature Predictive Budget Allocation

Predictive Budget Allocation is a feature in Smartly.io's tool that automates budget allocation for Facebook ad sets (see figure 5). The feature distributes a campaign budget automatically between multiple ad sets based on an optimization goal given by the user. The budget pool option in the feature allows budget allocation over multiple campaigns. The intention of the feature is to increase conversions and minimize the CPA (Cost-per-Action) level of the campaign(s). (Ojala 10 June 2015; Ojala 8 April 2016.)

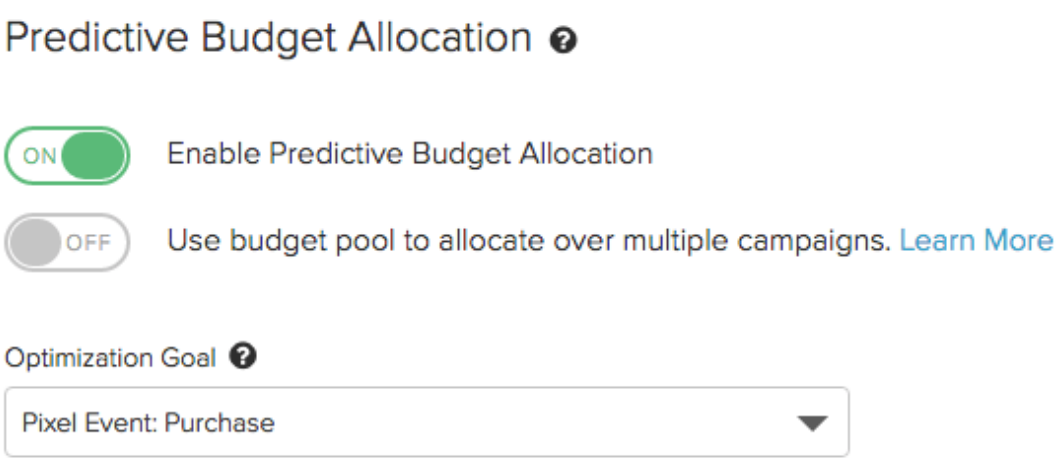

Figure 5: Screenshot of the predictive budget allocation feature. (Ojala 8 April 2016.)

In Facebook advertising, there are three levels to a campaign structure: campaign, ad set and ad. Campaign consists of one or more ad sets or ads and has one advertising objective, which can be awareness, consideration or conversions. Ad set consists of one or more ads. On ad set level the advertiser can define targeting, budget, scheduling, bidding and placement for the ads. Ad is the creative advertisement and the lowest level in Facebook's campaign structure. (Facebook business 2017.)

Conversion is the stage when a recipient of a marketing message performs a desired action, such as completing a sale (Kirkpatrick 15 March 2012). CPA, on the other hand, is a Facebook (and online) advertising pricing model, in which advertisers are only charged for actions that people have taken after seeing their ad (Facebook business 2017). Action – like conversion - usually refers to a customer making a sale but could also refer to another desired action like a registration (Marketing terms 2017).

The artificial intelligence behind the Predictive Budget Allocation -feature is machine learning and more specifically, the Bayesian multi-armed bandit method (Ojala 10 June 2015; Ojala 8 April 2016). Multi-armed bandit is a problem in probability theory that has been previously applied in cases such as budget allocation for competing research projects in large organizations (Gittins 1989).

The Predictive Budget Allocation –feature performs its decisions every midnight, utilizing data from the previous day's campaign performance. In some cases, the data is from a longer period of time when the previous day's data is limited. (Ojala 10 October 2017.)

4.5 Project: Implementing Predictive Budget Allocation to the Smartly platform

4.5.1 Background of the project

The project for implementing the Predictive Budget Allocation –feature to the Smartly platform started in 2015. Back then the 2-year-old startup had only 30 employees with an optimization team of two - a time they internally called “war mode” as they had big client cases coming in with a limited staff. (Ojala 10 October 2017.)

The implementation project of the Predictive Budget Allocation –feature started as a mere trial case, so the feature could’ve been discontinued if proven not useful. The feature, however, proved to be useful, so the project proceeded. (Ojala 10 October 2017.)

The development project of the feature can be divided into four phases: initiation, productizing, full rollout and maintenance & upgrading. The first three phases took approximately 1 month each (Ojala 10 October 2017). The maintenance phase is an ongoing process as the feature is even now upgraded and further developed.

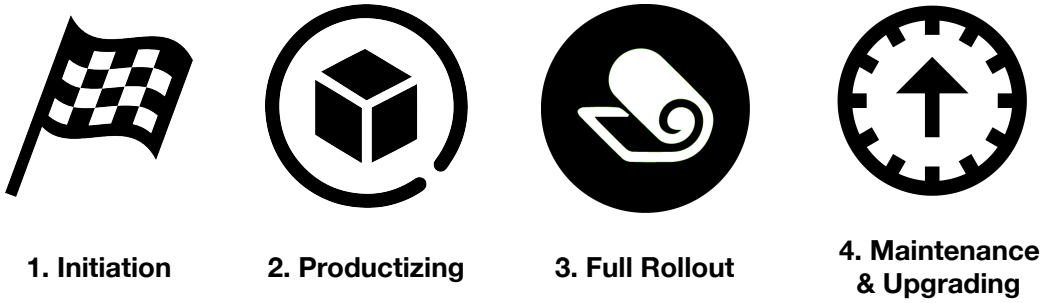

Figure 6. Phases of the development project for Predictive Budget Allocation.

4.5.2 Phase 1: Initiation

The first step was getting around the idea for the feature, which came over time with research, observing competitors and being aware of what Facebook was doing. The team detected that one of Smartly.io’s competitors had implemented something similar and Facebook was also missing the feature which led into considering it for the Smartly platform. (Ojala 10 October 2017.)

The project initiated by developing a weak prototype of the feature which was then tested against Smartly.io's competitor's solution. After the initial testing, the team knew there was a clear case for providing value to their customers with the feature. (Ojala 10 October 2017.)

As a big customer trial case was approaching, an opportunity arose for testing/validating a prototype of the feature with the customer. The trial case also prompted a fixed timeline and extra pressure for implementing the project. (Ojala 10 October 2017.)

The prototype that was used to test in the trial case only included core components of the feature with no user interface or any validations. The aim of the trial was to receive feedback from the test customer rapidly on how the feature should be developed, or if the feature was even necessary. (Ojala 10 October 2017.)

The first trial proved that the feature could work out, however the team also learned that there were errors made in the modelling of the feature. The feature allocated too much budget to the best performing campaign, which turned out not to bring the optimal results as previously thought. That was, however, not a big issue since it was merely a part of their "test & learn" development process. In fact, because of the early testing and the rapid feedback cycle, the issue could be fixed and the feature could be improved quickly. (Ojala 10 October 2017.)

4.5.3 Phase 2: Productizing

After the first customer trial case, the team knew that the feature works but it still needed improvement and had to be made scalable. They preceded the project into a productizing phase, meaning: transforming the feature from customer-specific into a more standardized and scalable software product. The team commenced testing with what could be called a beta version of the feature with first five and then ten more customers in order to receive feedback from them to develop it further. (Ojala 10 October 2017.)

4.5.4 Phase 3: Full Rollout

After the feature was once again tested, improved and productized with even more customers, came a time for a full rollout of the feature. Full rollout means that the feature was released to all of Smartly.io's customers. (Ojala 10 October 2017.)

4.5.5 Phase 4: Maintenance and upgrading

Since the full rollout, the feature has been continuously improved and upgraded. The maintenance & upgrading includes fixing issues that occur in customer cases as well as improving the feature to be more productized and stable. (Ojala 10 October 2017.)

The original data science was made with the statistical programming language R, which was later changed to Python that is a more productized language. For maintenance, the team has monitoring systems, so if something crashes or doesn't work, the issue can be analyzed and fixed quickly. (Ojala 10 October 2017.)

They've also added more features on top of the predictive budget allocation, including features for revenue optimization and budget scaling. The feature also now supports more metrics such as Facebook's metrics and third-party metrics. (Ojala 10 October 2017.)

5 Case Study 2: How Dagmar optimized programmatic buying of digital advertising for their clients

5.1 Introduction to Dagmar

Dagmar is a Finnish marketing agency founded in 1973 and owned by Salomaa Group. It is the biggest marketing agency in Finland, when measured by billings, gross profit and personnel. (Dagmar 2017.)

Dagmar has been historically known as a media agency as they specialized in media buying for companies (Koski 13 November 2017). Media agencies ensure that their clients' marketing messages are displayed in the right medias, at the right times with the optimal price to reach their target audience (Cambridge University Press 2011, 533).

However, today Dagmar is better described as a marketing agency as it currently specializes in consulting, planning and implementation of insight driven marketing. Dagmar serves its customers in areas such as analytics, customer insights, marketing technologies and marketing communications. (Dagmar 2017.)

Figure 7. Dagmar's logo. (Dagmar 2017.)

5.2 Organizational structure

Dagmar is currently branched into two departments: Dagmar Drive and Dagmar Stories. The company currently employs around 140 people. (Dagmar 2017.)

Dagmar Drive specializes in analytics, marketing technologies and marketing research. Dagmar Drive employs slightly over 20 people. Dagmar Stories specializes in contemporary content marketing. (Koski 13 November 2017.)

5.3 Organizational culture

Dagmar as an organization hasn't been afraid to transform from a media agency towards an insight driven marketing agency. With investments in areas such as analytics and artificial intelligence, the company is seemingly aware of current trends in the marketing landscape and renews itself accordingly.

In their website, Dagmar describes its core values with words such as boldness, enthusiasm, insightful approach and responsibility.

> We are guided by Dagmar's strong core values that show in our daily activities. Boldness means courage to reinvent oneself. Enthusiasm is curiosity, throwing oneself into work, seeing new opportunities. An insightful approach means building together future expertise. Responsibility means that each and every Dagmar employee bears responsibility for his/her own work and skills and for the wellbeing of his/her fellow worker and client interests.
> (Dagmar 2017.)

5.4 Introduction to project: optimizing programmatic buying of digital advertising

In present times, advertising is increasingly shifting into digital channels. Dagmar's clients are fairly evenly split between two digital advertising systems: Adform and DoubleClick by Google. The aforementioned systems are for managing and implementing programmatic buying of digital advertising space. (Koski 13 November 2017.)

The digital advertising systems still require a considerable amount of manual work from Dagmar's in-house digital advertising planner, who is in charge of their clients' programmatic buying. The manual work includes setting up campaigns, choosing target audiences, choosing bidding prices for advertising displays and selecting the type of retargeting that will be implemented to the campaign. (Koski 13 November 2017.)

What is great, however, is that both Adform and DoubleClick have APIs (application programming interface) that enable automation of all the manual work. In practice, everything that can be done manually by a human in the user interface of the systems, can be performed by a machine. (Koski 13 November 2017.)

During this year, 2017, Dagmar's Analytics team proceeded to build an AI system – working as an optimization engine - that automatically updates advertising campaigns' various parameters after they are manually set up in the digital advertising systems. The AI system aims to update the settings and parameters in a way that will increase conversions. In practice, the AI system currently allocates budgets within an advertising campaign to maximize its results. (Koski 13 November 2017.)

There are two perspectives from which the AI system provides benefits. From Dagmar's internal point-of-view it saves working hours and manual work of their digital advertising planner. From Dagmar's clients' perspective, the AI system provides better results with the same investment. Their pilot has been running for a little over half-a-year now with five different client cases – the next step in the project is to scale it to more clients. (Koski 13 November 2017.)

5.5 Project: optimizing programmatic buying of digital advertising

5.5.1 Background of the project

Before the project, Dagmar's Analytics team hadn't developed any fully functioning software into production. Because the project was the first of its kind, the expectations were set fairly low: if the project would have resulted in any kind of benefit, it would have been considered a success. (Koski 13 November 2017.)

5.5.2 Phase 1: Requirements specification

The project initiated as the Analytics team began researching different ways the programmatic buying process could be automated and optimized. The research included learning about the available APIs of the digital advertising systems and what could be done with them. (Koski 13 November 2017.)

After that, the requirements for the first MVP (minimum viable product) were specified by analyzing different factors in the programmatic buying process, such as: which tasks took a lot of manual work from their digital advertising planner and which optimizations would be most beneficial to Dagmar's clients. The features of the MVP were specified after the requirements analysis. (Koski 13 November 2017.)

5.5.3 Phase 2: Creating the MVP

After the requirements were defined, the project advanced in a straight forward manner: first develop an MVP and then start testing it in client cases. Approximately a month after the initiation of the project, the MVP was in operation, testing with a client case. (Koski 13 November 2017.)

The same MVP has since been a little over six months in use in five different client cases. During the six months, the system has been continuously improved from what has been learned from testing. The improvements include adding more features, making changes to the algorithms and customizing the system for specific client cases. (Koski 13 November 2017.)

5.5.4 Next steps in the project

The next step in the project is to scale the optimization engine to be in use in more client cases. Dagmar has over hundred client organizations, so the system has to be stable with a reliable architecture. Also new features will be developed into the system as it consists

of multiple segments. In addition, the user interface will be made more visual and user friendly. (Koski 13 November 2017.)

6 Results

6.1 Success factors in case 1: implementation of Predictive Budget Allocation at Smartly.io

6.1.1 Developing closely with customers

Working closely with a customer from the beginning stages of the project enables customer-centric development and can build trust between the vendor and the customer. Smartly.io usually chooses an advanced customer with internal technical know-how for the first customer trials. The first test customer is also usually from a vertical market such as ecommerce or travel industry as those represent Smartly.io's common customers. (Ojala 10 October 2017.)

6.1.2 Agile development approach

A big risk when developing new software or features is spending too much resources on something that turns out to be a bust. The aforementioned situation can be avoided by testing and validating a weak prototype early with an end user/customer. The early testing informs whether the feature should be developed and how - or if the project should be discontinued. (Ojala 10 October 2017.)

Especially with advanced technologies, such as AI, the development should start with trials to learn if the solution is feasible or not. If the solution is not tested in real-life use cases early on, the development might steer into a wrong direction or something could be built that nobody uses.

6.1.3 Full-stack development team

The optimization team working on the feature was *full-stack* in the sense that they are proficient in both data science and traditional software development. The hybrid skillset is important as the optimization feature is integrated into the Smartly platform which runs on traditional software code – which at the beginning of the project was JavaScript and PHP. (Ojala 10 October 2017.)

Proficiency in both domains enables rapid prototyping and development of the feature without external assistance. Also a key success factor in the project was that the same team worked on the feature from start to finish. (Ojala 10 October 2017.)

6.1.4 Supportive company culture

The original full rollout of the Predictive Budget Allocation –feature was implemented with a development team consisting of two people (Ojala 10 October 2017). A development project of this magnitude with limited personnel, demands hard work and commitment which can only be achieved when employee motivation and company culture is right.

Smartly.io has a company culture in which individual teams can make autonomous decisions that support the overall strategic vision of the company. That enables rapid development as there is no need to ask for c-level leadership support for decisions.

6.1.5 Finding a business case

Optimization team at Smartly.io got the idea for the predictive budget allocation –feature by research and awareness of what their competitors and Facebook were doing. Implementing an already proven technology solution decreases uncertainty and in Smartly.io's case enabled testing against their competitor's solution.

6.2 Success factors in case 2: Optimizing programmatic buying of digital advertising at Dagmar

6.2.1 Valuable business case

The AI system had a clear business case as it saved working hours and manual tasks from Dagmar's digital advertising planner and also performed better in the optimization task than a human. The AI system Dagmar created has measurably boosted performance of Dagmar's clients' digital advertising campaigns. (Koski 13 November 2017.)

6.2.2 Multidisciplinary development team

Dagmar's analytics team consists of five data scientists and one software developer. Dagmar's digital advertising planner also had a significant role as he provided domain expertise and acted as an end-user in the project. (Koski 13 November 2017.)

The data scientists in the team have extensive skills and knowledge on machine learning tools and techniques but are also familiar with traditional software development in various degrees. A software developer was added to the Analytics team to provide even stronger

skills and knowledge in software development, which ensures that the infrastructure and core of the code are of the highest quality. (Koski 13 November 2017.)

6.2.3 Agile development approach

Since this was the first project of its kind in Dagmar, the expectations for the end results were set fairly low. The first MVP was developed in a month which allowed rapid testing of the solution that provided insight on how to proceed in the project. (Koski 13 November 2017.)

6.2.4 Supportive company culture

Dagmar is a forward-thinking company and appears to have a proactive strategy towards the future of the marketing industry, which includes AI. The project for automating and optimizing digital advertising buying received strong leadership support which enabled the project to be implemented and succeed (Koski 13 November 2017).

6.3 Similarities in the projects

Both of the projects were implemented with an agile development approach. In practice this meant creating a quick prototype which was then tested and improved in a feedback cycle. Smartly.io also incorporates Kanban board in their working which is a project management tool that is part of the lean methodology.

Both of the projects started as trial cases with not too much pressure for success. In both cases, the first prototypes were created very quickly so not much resources would've been wasted if the projects were discontinued early on.

The projects were also similar in their use of tools and techniques. Statistical programming language R was used for the initial data science but Python was adopted when the algorithms were implemented to production use.

The skills and talent of the development teams are also similar as they are both multidisciplinary in data science and traditional software development. Smartly.io – however - emphasizes the multidisciplinary skills in each of their team members more, calling their team "full-stack".

In both cases, APIs (application programming interface) were used to provide the needed data for the projects. APIs are a great way to integrate data into data science projects efficiently.

	Smartly.io	Dagmar	
Methodologies	Agile & Lean	Agile	
Started as a trial?	Yes	Yes	
Tools & Techniques	R, Python, Javascript & PHP	R, Python, Docker & Google Cloud	
Talent	"Full-stack" development team	5 data scientists + 1 software developer	
Source of Data	Facebook APIs	Adform & DoubleClick APIs	

Figure 8. Similarities between the two projects.

7 Discussion

The aim of the research is to demonstrate two case studies of successful implementation projects of AI-powered marketing solutions and analyze the factors that contributed to their success. The main findings of the study indicate that agile development practices, supportive company culture, multidisciplinary development team and close customer/end-user involvement played a role in the success of both projects.

The findings of the study provide further insight into the best practices and success factors when implementing AI-powered marketing solutions. What is concluded from the research is of most significance to companies who are interested in successfully implementing similar projects.

The results analyzed from the case studies are not surprising, however the many similarities between the two cases were unexpected. Also, the level of detail in the case studies and results provide a holistic description of the projects that is never-before-seen.

The findings of the study support previous research conducted by McKinsey Global Institute in their 2016 discussion paper *Artificial Intelligence: The Next Digital Frontier*, about the elements of successful AI transformations. However, this research offers a more detailed description of implementation projects of artificial intelligence and is also more specified in marketing activities.

The findings of the research cannot be statistically generalized as they are based on only two case studies. However, the findings can be analytically generalized as they contribute to the general theories of the phenomenon – as the aforementioned study by McKinsey Global Institute.

The case studies were created mostly based on interviews conducted with people in leading roles in the projects. The result of that approach is that the case studies come from an admittedly one-sided perspective. Nonetheless, the aim of the study was always to demonstrate the success factors from the companies' perspective.

This subject matter could be further researched by analyzing success factors of more similar cases. In future studies more stakeholder interviews and observatory research could be conducted to avoid the one-sidedness of this research.

The research process has taught me as the writer a lot about project management, research, writing, artificial intelligence and marketing. I also learned about how to implement artificial intelligence in practice and what are the requirements for a successful AI project.

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Appendices

Appendix 1. Initial Thesis Schedule

task no.	Task	Outcome	Beginning criterion	Responsible	hours	Week 33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
1	**Starting the project**	**Accepted project plan**	**An advisor is assigned to the project**	**Sg**	**14**																		
1.1	Preparation of the starting meeting	All relevant material is delivered		Pm	6																		
1.2	Starting meeting	Project has been started	Project plan	Sg	6																		
2	**Planning the research**	**Theoretical framework and research questions**	**Project has been started**		**120**																		
2.1	Composing theoretical framework	Theoretical framework	Project has been started	Pm	100																		
2.2.	Composing the research questions	Research questions	Theoretical framework is composed	Pm	20																		
3	**Study**	**Research data collected and analyzed**	**Research questions are composed**	Pm	**70**																		
3.1	Collecting the research data	Research data is collected	Research questions are composed	Pm	50																		
3.2	Analyzing the research data	Research data is analyzed	Research data is collected	Pm	20																		
4	Writing of the thesis	The thesis is written	The writing of the thesis has started																				
5	**Project management**	**Managed project**	**Project has been started**	**Pm**	**14**																		
5.1	Reporting and follow-up of the progress	Status reports (2 pieces)	End of the reporting period	Pm	4																		
5.2	Steering group meetings	the meetings have been held	All relevant material is delivered, meeting time is agreed	Sr	8																		
4.4	Compose the minutes	minutes	the meetings have been held	Pm	2																		

Appendix 2. Steering meetings and thesis seminar documentation

1. **Steering meeting 1: Initiation meeting**

Date: 7 September 2017

Minutes: 20

Present: Mikael Mölsä (thesis writer) and Tuomo Ryynänen (thesis advisor)

Discussion: Project plan, next steps

2. **Steering meeting 2: presenting theoretical background**

Date: 12 October 2017

Minutes: 20

Present: Mikael Mölsä (thesis writer) and Tuomo Ryynänen (thesis advisor)

Discussion: Theoretical background, next steps

3. **Steering meeting 3: presenting the empirical part**

Date: 21 November 2017

Minutes: 30

Present: Mikael Mölsä (thesis writer) and Tuomo Ryynänen (thesis advisor)

Discussion: Empirical research, thesis progress and next steps

4. **Thesis seminar: presenting the thesis**

Date: 28 November 2017

Minutes: 20

Present: Mikael Mölsä (Thesis writer), Tuomo Ryynänen (thesis advisor), Altti Lagstedt (thesis coordinator) & other students. Thesis opponent wasn't present.

Discussion: Presenting the thesis and its progress.